REMARKS

Claims 1-7 and 9-23 are pending in this application, with claims 9-12 being withdrawn from consideration.

I. Withdrawal of Rejection

In the Office Action, claims 16-18 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,458,711 to Yang in view of U.S. Patent No. 4,483,438 to Kobiella and U.S. Patent No. 4,265,954 to Romanek. Applicants acknowledge the May 23 Advisory Action indication that this rejection has been overcome by Applicants' May 12 Amendment and response and withdrawn.

II. Non-obviousness of the subject matter of claims 1-5, 7 and 13-19 over Van Vliet (CA 2,162,686) in view of Kobiella (US 4,483,438), Romanek (US 4,265,954) and Saito (CA 1,026,522)

Claims 1-5, 7 and 13-19 remain rejected under 35 U.S.C. §103(a) over Canadian Patent Publication No. CA 2,162,686 to Van Vliet in view of U.S. Patent No. 4,483,438 to Kobiella, U.S. Patent No. 4,265,954 to Romanek, and Canadian Patent Publication No. CA 1,026,522 to Saito. This rejection is respectfully traversed.

The present invention is concerned with solving a problem of early rupture of geogrids subjected to heavy loads. It has been found by Applicants that the source of such failures is at the bonding site. See Applicants' page 1, lines 18-23 and page 2, line 7 - page 3, line 2. Applicants have discovered the source of the problem being at the point where an elongated strip under tensile force is welded to a transverse strip. Such loading causes the transverse strip to split because it has a lower strain to failure in this direction. This split, because of its attachment to the loaded strip, causes a crack in the loaded strip, which leads to early rupture. However, Applicants have solved this problem by providing spatially separated bonding points in the overlap zone. Applicants have found that because of this spatial separation, the split in the transverse strip is incapable of exerting force to the loaded strip, preventing the problem of early rupture of the loaded strip.

A. Van Vliet

In the rejection from January 13, 2003, page 3, 2nd paragraph, 2nd sentence, the Examiner correctly mentioned that Van Vliet teaches forming a mat (recognized as applicant's grid) by bonding the strips in at least one zone of overlap by electromagnetic radiation. However, Van Vliet fails to suggest said bonding zone of overlap comprising at least two spatially separated bonding points or bonding lines.

In the Advisory Action, the Examiner changed his mind in saying that the embedding of adsorption particles to control melted regions from non-melted regions as disclosed by Van Vliet would describe a point bonding process as means to maintain the strength at the zone of overlap. This shows that the Examiner may not understand what Van Vliet's regions containing absorbing particles look like. So, it seems necessary to extensively explain the geometrical shape of the regions disclosed by Van Vliet '686.

In the sentence bridging pages 1 and 2, Van Vliet discloses a drawn weldable plastic strip by the fact that it comprises at least one surface, in which surface are embedded absorbing particles which have a distinctive higher absorption capacity for electromagnetic radiation within the frequency range from 10 to 50,000 MHz than the plastic of which the strip is made.

On page 2, 2nd paragraph, Van Vliet discloses that the strips according to his invention can be made by usual methods in the manufacturing of two-layer strips, wherein however, the finished strip now has the same plastic over the whole cross-section. ... During welding, owing to the embedded absorption particles, almost only the region containing these particles is melted, so that outside the region containing the absorption particles disorientation of the strips is largely or even usually absent ...

So, Van Vliet discloses strips exhibiting a first region containing the absorption particles and a second region outside the first region. Regarding the geometrical shape of the first and second layer, Van Vliet discloses the following:

- Page 2, 5th paragraph: Preferably the strip has a thickness which is at least ten times as great as the layer thickness of the surface layer comprising the absorption particles.

- Page 4, lines 10-12: The surface layer containing the absorption particles must only have a thickness of a few tenths of a millimeter or less, for example 10 to 40 μm.

So, regarding the geometrical shape of the first and said second region, Van Vliet discloses strips exhibiting (1) as the first region a surface layer comprising the absorption particles, which surface layer extends over the total length of the strips, and (2) as the second region a layer free of absorption particles, arranged below said first region and extending over the entire length of the strips.

Regarding the formation of a mat by welding, Van Vliet discloses on page 3, lines 25-30:

- The mat according to the invention ... consists of crossed strips which are welded together at their crossing points, and ... contains strips which are welded together by their surface layer containing the absorption particles.

Prima facie, the crossing points represent the entire zones of overlap of the crossed strips, which entire zones of overlap are melted in their surface layer containing the absorption particles, i.e., in the first region, which also extends over the entire zone of overlap and inevitably is welded together over the entire zone of overlap of the crossed strips.

Therefore, Van Vliet does not disclose or make obvious a point bonding process as claimed having at least two spatially separated bonding points. Quite to the contrary, from Van Vliet's teaching, it is completely impossible to arrive at a grid having zones of overlap comprising at least two spatially separated bonding points or lines as taught by claim 1 of the present invention without impermissible hindsight consideration of Applicants' disclosure.

One skilled in the art of grids if comparing Van Vliet's grid with the grid of the comparative example of the present invention (see description of the present invention, page 6, lines 8-27) would find the following:

	Van Vliet	Present Invention
Strip material	Plastic (Title)	Polyethylene terephthalate
Thickness of layer containing adsorption particles	a few tenths of a millimeter or less e.g. 10 to 40 μm (page 4, lines 10-12)	5-100 μm (p. 4, 1. 24) 0,02 mm = 20 μm (page 4, lines 3032)
Material of particles	soot (page 6, lines 2-4)	carbon black (page 6, line 15)

One immediately recognizes that Van Vliet's grid is about the same grid as the comparative grid of the present invention, which suffers a large (~ 15%) decrease in strength retention. Inevitably, Van Vliet's grid also suffers from about the same degree of strength retention.

This clearly shows that Van Vliet discloses a kind of grid that exhibits the problem of early rupture. This problem was solved for the first time by a grid with zones of overlap comprising at least two spatially separated bonding points or lines (see claim 1 of the present invention), which leads to no such decrease in strength in spite the occurrence of cracks (see present invention, page 6, last paragraph), i.e., to 100% strength retention.

Consequently, the Examiner's statement "Although Van Vliet doesn't positively address the problem of early rupture, this benefit would directly flow from Van Vliet's teaching to generate fused and unfused regions in the zone of overlap of crossed strips in forming a grid like mat" is factually inaccurate.

B. Kobiella

As explained in Applicant's May 12 Amendment, Kobiella's technical field is that of a joint for securing together overlapping portions of a thermoplastic strap (singular). See Kobiella, column 1, line 14-16. In accordance with this teaching, the overlap of said strap is with itself (see Kobiella, Fig. 1: Strap S overlaps in portion J with itself). This overlap serves in bonding a stack of newspapers or magazines (see Kobiella, column 1, lines 64-67).

In contrast to Kobiella, the present invention pertains to a grid comprising drawn polymeric strips in at least two different directions, with the strips being bonded together in the zone or zones of overlap (see present invention, description page 1, lines 8-11). So, Kobiella's technical field is prima facie different from that of the present invention. Consequently, one skilled in the art of grids will never read or look to Kobiella.

Nevertheless, as outlined in Applicants' May 12 remarks, one skilled in the art of grids would find in column 6, lines 8-11 that Kobiella's spaced joint J having spaced fused regions exhibits a strength of at least 75% of the strap strength, i.e., a loss in strength retention of up to 25% .

However, the closest prior art to the present invention given by longitudinal and transversal straps bound together over their entire zone of overlap exhibits only a 15% loss in strength retention (see present invention, description page 6, lines 22-27). So, if anything, one would be taught by Kobiella that fusing the zone of overlap of longitudinal and transversal straps with separated lines will result in a loss of strength retention which is up to $(25/15) \cdot 100 = 67\%$ worse than that of longitudinal and transversal straps fused on their entire zone of overlap. Consequently, one of ordinary skill would not have been motivated to solve the present invention's problem of early rupture by spaced welding lines or by whatever manner of spaced fused regions in the zone of overlap of longitudinal and transversal straps of the grid. Quite to the contrary, this may even warn against use of Kobiella's structure with grids.

References must be read for their entire teachings, including teachings that teach away from their combination with other references. Moreover, references must be read in light of their own disclosures. The Examiner's opinion that Kobiella maintains the tensile strength at the zone of overlap is falsified by Kobiella himself, which by the above disclosure admits to a weakened structure and teaches away from the asserted combination.

Moreover, if anything at all is obvious from Van Vliet in view of Kobiella, it is the expectation that the about 15% loss in strength retention of the longitudinal strips observed with Van Vliet's grid might even increase up to 25%, if Kobiella's teaching is applied. Consequently, the Examiner's opinion "...it would have been obvious to one of ordinary skill in the art at the time of the invention to position the absorption particles of Van Vliet in at least two spatially separated bonding lines to further the degree at which regions in the zone of overlap remain free of disorientation and therefore increase the degree in the degree to which the strength of the strips is maintained in the zone of overlap" is factually inaccurate from these combined teachings and can only be made with impermissible hindsight consideration of Applicants' specification.

C. Romanek

Romanek fails to overcome deficiencies of Van Vliet and Kobiella. As explained previously, Romanek's technical field is that of non-woven sheets or webs of fibers which sheets or webs are fused in preselected areas (see Romanek, column 1, lines 5-8). The Examiner correctly mentioned in his rejection from January 13, 2003 that the sheet or webs bound over their entire surface become too stiff for many applications. However, too high stiffness, i.e. too low flexibility, is neither a problem of grids, nor the problem of early rupture underlying the present invention. Therefore, one skilled in the art, who was faced with the problem of early rupture in grids would not have consulted Romanek.

Nevertheless, even if one would read Romanek, he would find preselected points or areas which are preselected from the total area of the non-woven sheet or web (see Romanek, column 2, lines 29-36 and Fig. 5-8, which explicitly show, that the fused areas are preselected from the total area; also the description of figures 5-8 given in column 6, lines 40-45 do not allow any other conclusion.) Therefore, this does not mean preselected points or areas within the zone of overlap of the fibers which constitute Romanek's non-woven sheets or mats. One skilled in the art of grids would not find any indication in Romanek that at least one zone of

overlap of said fibers comprises at least two spatially separated bonding points or lines as claimed.

Quite to the contrary, to fuse at least some of the thermoplastic fibers in the preselected areas (see Romanek, column 2, lines 50-52) clearly discloses that in the preselected areas, fibers are fused over their entire zone of overlap. So, Romanek discloses a kind of bonding between the fibers from which the present invention starts. This kind of bonding gives rise to the problem of early rupture (see present invention, description page 2, lines 6-30). Romanek's non-woven sheet or web exhibiting the preselected areas described above is fused to a sheet or web of another material, the sheet or web is perforated in preselected areas and tufting fibers are rigidly bound in a substrate of such a sheet or web, thus firmly bonding tufting materials therein and having an improved density of tufting (see Romanek, column 2, lines 56-61).

Therefore, if the Examiner cites Romanek as providing additional examples of patterned bonding and refers to figures 5-8, one skilled in the art immediately recognizes that the parallel bonding lines and bonding dots do not extend within the zone of overlap of the fibers which constitute Romanek's non-woven sheets or mats.

D. Saito

Saito fails to overcome deficiencies of the above references. Saito discloses on page 3, lines 10-27 tapes consisting of a laminated plastic film of at least two layers of different polymers wherein the first layer is a crystalline layer and the second layer is a polymer of a lower melting or softening point than said first layer. Said tapes are woven in a manner that the lower melting point layers of the longitudinal tapes are facing the lower melting point layer of the transverse tapes. Then, the tapes so woven are heated under pressure so that the lower melting point layers bond together at their points of contact. This clearly means that longitudinal and transversal tapes are bound over the entire zone of overlap. The same holds

for the other embodiments of Saito's teaching which he discloses on page 3, line 28 - page 4a, line 16.

Moreover, Saito discloses a kind of bonding between the tapes which is more away and represents the prior art, which Van Vliet describes when he refers to the prior art of his invention on page 1, 2nd paragraph. Consequently, since Van Vliet teaches away from this, the combination is improper because there is no motivation for the combination.

As such, independent claims 1 and 16 define over the applied references and are allowable. Dependent claims 2-5, 7, 13-15 and 17-19 are also allowable for their dependence on allowable base claims and for the additional features recited therein. Withdrawal of the rejection is respectfully requested.

III. Non-obviousness of the subject matter of claims 6 and 19-23 over Van Vliet (CA 2,162,686) in view of Kobiella (US 4,433,438), Romanek (US 4,265,954) and Saito (CA 1,026,522) and further in view of Hoechst (FR 1,506,163) and Foglia et al. (US 3,560,291).

Claims 6 and 19-23 remain rejected under 35 U.S.C. §103(a) over Van Vliet, in view of Kobiella, Romanek and Saito, further in view of French Publication No. FR 1,506,163 to Hoechst and U.S. Patent No. 3,560,291 to Foglia. This rejection is respectfully traversed.

The primary references are discussed above. The Examiner is correct in saying that Hoechst and Foglia et al. disclose to weld thermoplastic materials (e.g. foils, films, strips). However, his opinion in view of the motivation of Kobiella and Romanek to provide spaced bonding "patterns to the bonding overlaps of Van Vliet, one of ordinary skill would have been motivated to employ a laser beam as bonding with lasers enables a welding area or spot to be made of various sizes and bonds to be formed in very short times" is factually flawed because there is no motivation of Kobiella and Romanek to provide spaced bonding patterns to the bonded overlaps of Van Vliet as discussed above. Quite to the contrary, Kobiella even warns against applying spatially separated bonding points or lines in the zone of overlap. As such, claims 6 and 19-23 are allowable for their dependence on allowable base claims and additional recited features. Withdrawal of the rejection is respectfully requested.

IV. Conclusion of Non-Obviousness of Pending Claims

As a summary, one skilled in the art of grids and faced with the problem of early rupture

- will read Van Vliet and cannot find any solution for the problems,
- will not read Kobiella which is in a different technical field (or if he would read Kobiella he would even be warned against solving said problem by spaced welding lines.),
- will not read Romanek which is in a different technical field (or if he would read Romanek he would recognize that Romanek discloses a kind of bonding between the fibers from which the present invention overcomes).
- might read Hoechst and Foglia, but in view of Romanek would not be motivated and in view of Kobiella is even warned against applying spatially separated bonding points or lines in the zone of overlap.

Consequently, in whatever way one skilled in the art combines the cited documents, he would not have arrived at a grid comprising drawn polymeric strips in at least two different directions, with the strips being bonded together in at least one zone of overlap, wherein said at least one zone of overlap comprises at least two spatially separated bonding points or lines as claimed.

Quite to the contrary, by the cited documents, one skilled in the art would have been guided to the prior art, from which the present invention starts (Van Vliet and Romanek) or he would have been guided to prior art, which is even further away from, that such as (Saito). As such, the claimed invention is not obvious.

V. Rejoinder of Withdrawn Claims 9-12

Claims 9-12 are withdrawn from consideration as being directed to a non-elected invention. However, claims 9-12 are directed to a process of making the grid of claim 1.

Accordingly, Applicants submit that claims 9-12 should be rejoined with claims 1-7 and 13-23 at least because claim 1 is allowable for the reasons discussed below.

VI. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-7 and 9-23 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

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